

L 37687-66

ACC NR: AP6024502

beam will travel the entire length of the active medium was estimated roughly at 11'—18', for $d = 2-3 \mu$ and $l = 0.5-0.7 \text{ mm}$. Orig. art. has: 2 figures and 2 formulas. [YK]

SUB CODE: 20/ SUBM DATE: 26Jan66/ OTH REF: 002/ ATD PRESS: 5041

Card 3/3

L 46952-66 EWT(1)/EWI(m)/EEC(k)-2/T/ENF(t)/ETI IJP(c) JD/JG
ACC NR: AP6031029 SOURCE CODE: UR/0109/66/011/009/1645/1650

AUTHOR: Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Trushina, V. Ye.; Tsarenkov, B. V.

ORG: Physico-Technical Institute im. A. F. Ioffe, AN SSSR (Fiziko-tekhnicheskii institut AN SSSR)

TITLE: Electron-photon ¹¹GaAs ¹¹transistor ²⁰_B

SOURCE: Radiotekhnika i elektronika, v. 11, no. 9, 1966, 1645-1650

TOPIC TAGS: transistor, electron photon transistor, gallium arsenide transistor, *GALLIUM ARSENIDE, ELECTRON, PHOTON*

ABSTRACT: The results of an experimental investigation of GaAs electron-photon transistors (R. Rediker et al., Proc. IEEE, 1763, 51, 1, 218) at 77 and 293K are reported. The transistors were made from Te-doped n-GaAs. Source material parameters: electron concentration, 7×10^{17} -- 5×10^{18} per cm^3 ; mobility, 1800--3200 $\text{cm}^2/\text{v sec}$; dislocation density, 10000 per cm^2 ; p-n-p structure was produced by Zn diffusion; plate thickness, 300 μ ; base thickness, 100-200 μ ; p-region thickness, 50--100 μ . Collector current vs. collector voltage characteristics (for 0--100 amp/cm^2 emitter current) and collector current vs. emitter current characteristics are shown. The emitter-collector current transfer ratio was found to increase from 0.05 to 0.075 with the collector voltage increasing from 0 to 8 v, at 77K. At room temperature, the transfer ratio amounts to 1/20-th of the liquid-nitrogen ratio. When the emitter

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UDC: 539.293.011.43

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ACC NR: AP6031029

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current increases from 0.1 to 0.5 amp, the power gain decreases from 12 to 4 and the voltage gain, from 350 to 80 (at 77K). The estimated total quantum yield of photons is 0.1 at 77K. Desirability is noted and ways are indicated for making the electron-photon transistor a practical amplifier. Orig. art. has: 4 figures and 1 formula. [03]

SUB CODE: 09 / SUBM DATE: 29Mar65 / ORIG REF: 003 / OTH REF: 006 / ATD PRESS: 5089

Card 2/2 afa

L 04741-67 EWT(1)/EWT(m)/EWP(t)/ETI LJP(c) AT/JD

ACC NR: AP6024472

SOURCE CODE: UR/0181/66/008/007/2098/2103

AUTHOR: Imenkov, A. N.; Kozlov, M. M.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-
tekhnicheskii institut AN SSSR)

TITLE: Kinetics of radiative recombination of nonequilibrium carriers in GaAs p-n
junctions

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2098-2103

TOPIC TAGS: gallium arsenide, radiative recombination, semiconductor carrier, pn
junction, relaxation process, spectral distribution, radiation intensity

ABSTRACT: The authors report results of experiments on the dependence, on the current
density, of the intensity of radiation for different bands of the spectrum (photon
energy range 0.7 - 1.5 eV) of GaAs diffusion p-n junctions, at 77 and 293K, and also
results of a simultaneous investigation of the relaxation of the radiation intensity
when rectangular current pulses are passed through the junction. The relaxation study
is a continuation of earlier work by the authors (Abstracts of Papers of Second All-
Union Conference on p-n Junctions, AN LatSSR, Riga, 1964, p. 14) where a long-wave
aftereffect was noted after the termination of a square pulse. The GaAs p-n junctions
were obtained by diffusion of Zn, Cd, or Cd and Mn jointly. The tests consisted of
determining the spectral distribution of the radiation intensity; the variation of the
radiation intensity with the current, and oscillograms of the current, voltage, and

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ACC NR: AP6024472

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radiation-intensity pulses. The current pulses ranged in amplitude from 0.05 to 7 amp and in duration from 10 to 100 μ sec. Pulses with duration ~ 10 nsec were also used. The spectrum consisted of several bands, the presence of which indicates that the recombination of the nonequilibrium carriers goes in part through deep levels. The possible kinetics of such a process are discussed. The current and voltage relaxation time is several orders of magnitude shorter than the intensity relaxation time of the long-wave radiation. The bands with longer wavelength have longer relaxation times. The two bands with the longest wavelength are attributed to recombination of the minority carriers injected over the potential barrier and captured at deep levels. The authors thank O. V. Konstantinov, V. I. Perel', and A. L. Efros for a discussion of the results. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 11Dec65/ ORIG REF: 002/ OTH REF: 002

Card 2/2 *ad*

L 4214 -36 EST(1)/E T(m)/T/ETP(t)/ETI LJP(c) AT/JD/JG

ACC NR: AP6026705

SOURCE CODE: UR/0181/66/008/008/2462/2465

AUTHOR: Danilova, T. N.; Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B.V.

ORG: Physics-Engineering Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-
tekhnicheskiy institut AN SSSR)

TITLE: Comparative investigation of the recombination radiation of GaAs p-n junctions with and without a Fabry-Perot resonator

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2462-2465

TOPIC TAGS: ~~Fabry-Perot~~ resonator, recombination radiation, pn ~~diode~~, ^{transition,} gallium
arsenide, ^{diode}

ABSTRACT: The published literature contains information on the investigation of spontaneous, stimulated, and coherent radiation of GaAs p-n junctions pertaining to the characteristic radiation parameters as a function of the current for diodes with or without resonators. The purpose of the present article is to compare the dependences of the maximum energy $h\nu_M$ and the half-width δ of the fundamental radiation band on the current density through a single p-n junction with and without a Fabry-Perot resonator. The authors studied diodes in which the p-n junctions were obtained by diffusion of zinc in Te-alloyed n-GaAs with electron concentration $7 \cdot 10^{17} - 3 \cdot 10^{18} \text{ cm}^{-3}$; the area of the p-n junction $\approx 10^{-3} \text{ cm}^2$. The current through the diode and the spectral distribution of radiation intensity were measured. It was found that $h\nu_M$, starting

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ACC NR: AP6026705

from the lowest current densities ($\geq 5 \text{ a/cm}^2$), increases with increasing current and then becomes practically independent of the current. The dependence of δ on current density is given for small current densities (5--70 a/cm^2). It is concluded from the results presented that the primary narrowing of the spectrum occurs as a result of population inversion at the rarefied states which are responsible for the secondary narrowing of the spectrum, i.e., beyond the conventional stimulated and coherent radiation with maximum energy $\approx 1.47 \text{ ev}$. The "tails" in the forbidden zone are probably the rarefied states responsible for the primary narrowing of the spectrum. The authors thank O. V. Konstantinov, V. I. Perel', and A. L. Efros for discussing the results of this work. Orig. art. has: 2 figures. [26]

SUB CODE: 20/ SUBM DATE: 26Jan66/ ORIG REF: 001/ OTH REF: 001/ ATD PRESS: 5064

Card 2/2

L 44602-66 EWT(1)/EWT(m)/EEC(k)-2/T/EWP(k)/EWP(t)/ETI IJP(c) WC/JD/Jr
 ACC NR: AP6030977 SOURCE CODE: UR/0181/66/008/009/2789/2791

AUTHOR: Kogan, L. M.; Libov, L. D.; Nasledov, D. N.; Nikitina, T. F.;
 Strakhovskiy, G. M.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-
 tekhnicheskiiy institut AN SSSR); Physics Institute im. P. N. Lebedev AN SSSR, Moscow
 (Fizicheskiiy institut AN SSSR)

TITLE: Certain properties of ²⁷GaAs laser diodes with an epitaxial p-n junction at
 room temperature ¹⁷

SOURCE: Fizika tverdogo tela, v. 8, no. 9, 1966, 2789-2791

TOPIC TAGS: solid state laser, semiconductor laser, gallium arsenide, laser, epitaxial
 diode, infrared laser, PN JUNCTION, EPITAXIAL GROWING

ABSTRACT: In an experimental investigation of epitaxial p-n GaAs junctions, tellurium-
 doped n-type and zinc-doped p-type GaAs was used. The electron concentration in the
 n-type GaAs was $5.5 \times 10^{17} - 2.4 \times 10^{18} \text{ cm}^{-3}$; the hole concentration in the p-type GaAs
 was $1.5 \times 10^{18} - 2.4 \times 10^{19} \text{ cm}^{-3}$. The specimens were oriented along the (100) plane
 and the epitaxial p-n junction was prepared from the liquid phase by a method described
 elsewhere (H. Nelson, RCA Rev., 24, 603, 1963). The dislocation density near the p-n
 junction in the epitaxial layers did not exceed that in the wafer and was 10^4 cm^{-2} .
 The Fabry-Perot cavity was formed by the cleaved (110) surfaces, and the electrical

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ACC NR: AP6030977

contacts were made of indium. The residual resistance of a diode with an area of 10^{-3} cm^2 was less than 0.1 ohm. Laser action at room temperature was achieved with 30-nanosec current pulses. An FEU-22 photomultiplier recorded the optical output. The threshold currents were determined from the dependence of intensity on current. The p-type GaAs specimens with hole concentrations of $2.4 \times 10^{19} \text{ cm}^{-3}$ and a mobility of $50 \text{ cm}^2/\text{v}\cdot\text{sec}$ lased at 9000 \AA at threshold currents of $1.5 \times 10^5 \text{ amp/cm}^2$. Investigations were also made of specimens in which the epitaxial layer, doped with zinc and partly compensated by lead, was grown on a tellurium-doped GaAs substrate with an electron concentration of $9.5 \times 10^{17} \text{ cm}^{-3}$ and a mobility of $2400 \text{ cm}^2/\text{v}\cdot\text{sec}$. These lased at room temperature at 9010 \AA at currents of $3.8 \times 10^5 \text{ amp/cm}^2$ and at 8910 \AA at currents of $4.7 \times 10^5 \text{ amp/cm}^2$ and up. The power per pass of p-GaAs lasers was 30 watts with 700-amp currents and 18-nanosec pulses; that of n-GaAs lasers was 10 watts with 300-amp currents and 30-nanosec pulses. Orig. art. has: 1 figure. [YK]

SUB CODE: 20/ SUBM DATE: 25Mar66/ ORIG REF: 001/ OTH REF: 003/ ATD PRESS: 5078

Card

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ACC NR: AP6036972

(A,N)

SOURCE CODE: UR/0181/66/008/011/3282/3287

AUTHOR: Gladkiy, B. I.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN USSR, Leningrad (Fiziko-tehnicheskii institut AN SSSR)

TITLE: Variation of the current-voltage characteristic of a GaAs laser during transition from the amplification to the generation mode

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3282-3287

TOPIC TAGS: laser, semiconductor laser, volt ampere characteristic

ABSTRACT: The characteristic of the gallium arsenide diode was investigated with the aid of a Fabry-Perot resonator at currents corresponding to the transitions from the amplification to the generation mode. The p-n structure of the diodes used in the experiment was based on n-gallium arsenide alloyed with tellurium (electron concentration $2 \times 10^{18} \text{ cm}^{-3}$); the p-region was alloyed with zinc. The p-n crystal was 170 to 200 μm thick, the p-region was 50 to 60 μm thick, and the p-n transition area was approximately 10^{-3} cm^2 . The following characteristics were measured: current-voltage; spectral distribution of radiation intensity at different currents; and differential capacitance versus voltage. The experimental results show that at diode voltages of $U \geq \frac{E_g}{q}$ (E_g is the width of the forbidden band of gallium arsenide, q is the electron charge), the I-U characteristic has two linear sections, with a sharp

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ACC NR: AP6036972

transition from the first to the second, i.e., I-U is deflected. Each section is characterized by its U_{sec} and its differential resistance R_{res} , and the bend of the curve occurs in the transition region. The most probable cause for the decrease in R_{res} at $U > \frac{E_g}{q}$ is the increase of charge carriers in the layer as the result of the internal photoeffect, which is caused by photons emitted owing to the recombination of nonequilibrium carriers at direct current through the p-n transition. Orig. art. has: 4 figures.

SUB CODE: 20/ SUBM DATE: 07May66/ ATD PRESS: 5108

Card 2/2

ACC NR: AP6030155

SOURCE CODE: UR/0120/66/000/004/0189/0193

AUTHOR: Gol'dberg, Yu. A.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physico-Technical Institute, AN SSSR, Leningrad (Fiziko-tehnicheskiy institut AN SSSR)

TITLE: The ohmic contact between gallium arsenide and indium

SOURCE: Pribery i tekhnika eksperimenta, no. 4, 1966, 189-193

TOPIC TAGS: gallium arsenide, indium, semiconductor research

ABSTRACT: The wetting of gallium arsenide surface with indium, and the extent of fusion and contact resistance as a function of temperature and fusion time were studied. It is shown that 100% wetting and minimum contact resistance occur at a temperature of 500°C and above. The GaAs-In junction was obtained by fusion in hydrogen. Hydrogen was used as the reducing medium to prevent the oxidation of In and GaAs at high temperatures. To prevent the explosion of the hydrogen-air mixture, a neutral gas was passed through the system before and after the hydrogen was turned on. The gases were dried by cooling them to a temperature of -196°C. Activated charcoal was used to purify H₂ and He at liquid nitrogen temperature. The following parameters were determined during the fusion process: the edge wetting angle, contact resistance, wetting coefficient, depth of fusion, and hole shape. The reduced resistance of the n-GaAs-In

UDC: 621.382.032.27

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ACC NR: AP6030155

contact was 10^{-5} ohm·cm² while that of the p-GaAs-In contact was 10^{-4} - $5 \cdot 10^{-5}$ ohm·cm². The author expresses his gratitude to A. D. Forelenk, Ye. A. Posse, and V. P. Yurochkin for their assistance. Orig. art. has: 5 figures.

SUB CODE: 20,09/ SUBM DATE: 16Jul65/ ORIG REF: 007/ OTH REF: 004

Card 2/2

ACC NR: AP6032018

SOURCE CODE: UR/0306/66/004/006/0208/0210

AUTHOR: Kogan, L. M.; Libov, L. D.; Nasledov, D. N.; Nikitina, T. F.; Orayevskiy, I. N.; Strakhovskiy, G. M.; Sungurova, O. A.; Tsarenkov, B. V.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, USSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Continuous coherent radiation of epitaxial diodes of GaAs at 77K

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 6, 1966, 208-210

TOPIC TAGS: gallium arsenide, epitaxial growing, pn junction, semiconductor laser, emission spectrum, recombination emission

ABSTRACT: The authors report continuous generation from a GaAs semiconductor laser with epitaxial pn junction operating with the medium at 77K. The junction was produced by liquid epitaxy by the method of H. Nelson (RCA Rev. v. 24, 603, 1963). The epitaxial layer was doped with tellurium to a density $\sim 5 \times 10^{18} \text{ cm}^{-3}$. A Fabry-Perot type resonator was produced by cleavage along the (110) plane. Emission values of the spectra of the same diode, obtained at different values of the exciting current, in pulsed or continuous operation, show that the maximum of the recombination spectrum shifts toward shorter wavelengths with increasing current; this shift is due to the "dispersal" of the Fermi quasilevels with increasing pump energy, and also to the shift to the long-wave section of the spectrum in the continuous mode, relative to

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ACC NR: AP6032018

the spectrum in the pulsed mode, connected with the constant heating of the active region in the continuous case. This difference between the spectra in the two modes is larger for small currents and decreases on approaching the threshold current. The latter effect is connected with the presence of deep electronic levels with very low state density. Coherent radiation in the continuous mode occurs at a current of 250 ma (612 a/cm^2). The narrow spectral line appearing in this case corresponds most probably to the non-axial "annular" type of resonator oscillations. At 410 ma (1020 a/cm^2), a new system of coherent lines appears, which can be interpreted as corresponding to axial modes of the cavity. The total emission power of the diode for which the spectra are presented is 5 mW at the appearance of the first coherent line and 70 mW at a current 1.5 a. Orig. art. has: 1 figure. [02]

SUB CODE: 20/ SUBM DATE: 13Jun66/ OTH REF: 002/ ATD PRESS: 5084

Card 2/2

ACC NR: AP7001959

SOURCE CODE: UR/0120/66/000/006/0160/0184

AUTHOR: Gol'dberg, Yu. A.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute, Academy of Sciences SSSR, Leningrad (Fiziko-
tekhnicheskiy institut AN SSSR)

TITLE: Thin multilayer gallium arsenide-metal contacts

SOURCE: Pribery i tekhnika eksperimenta, no. 6, 1966, 180-184

TOPIC TAGS: ohmic contact, multilayered ohmic contact, gallium arsenide, gold, tin,
nickel, zinc, silver, copper

ABSTRACT:

A method of manufacturing gallium arsenide-metal contacts by chemical deposition of thin metal layers has been developed. The method permits uniform coating of gallium arsenide with thin (about 1 μ) layers of various metals with a very small (1 μ) depth of fusion. The main advantage of the small depth of fusion is that the crystals can be cleaved together with the deposited metals. It was found that with only one metal, the contact was either nonohmic, not sufficiently low-ohmic, or technologically unsuitable. The best low-ohmic contacts were obtained with several layers of various metals deposited on gallium arsenide. For instance a contact

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UDC: 621.382.032.27

ACC NR: AP7001959

on N-type gallium-arsenide coated with Au-Sn-Ni-Au (deposited in that order) has a resistance (per unit area) of 10^{-5} ohm cm^2 ; a contact on p-type gallium arsenide coated with Au-Zn-Ni-Au has a resistance of 10^{-4} ohm cm^2 .
Orig. art. has: 2 figures and 2 tables.

SUB CODE: 11, 09/ SUBM DATE: 03Dec65/ ORIG REF: 004/ OTH REF: 007
ATD PRESS: 5111

Card 2/2

BELLE, M.L.; VALOV, Yu.A.; GORYUNOVA, A.N.; ZLATKIN, L.B.; IMENKOV, A.N.;
KOZLOV, M.M.; TSARENKOV, B.V.

Optical and photoelectric properties of ZnSiP_2 single crystals.
Dokl. AN SSSR 163 no.3:606-608 J1 '65. (MIRA 18:7)

1. Fiziko-tekhnicheskii institut im. A.F.Ioffe AN SSSR. Submitted
January 29, 1965.

L COC63-66 EMT(m)/EPF(c)/EAP(t)/EAP(b) IJP(c) JD

ACCESSION NR: AP5021323

UR/0120/65/000/004/0014/0022
621.382.032.27

AUTHOR: Libov, L. D.; Meskin, S. S.; Nasledov, D. N.; Sedov, V. Ye.;
Tsarenkov, B. V.

TITLE: Gallium arsenide-metal ohmic contacts

SOURCE: Pribery i tekhnika eksperimenta, no. 4, 1965, 14-22

TOPIC TAGS: gallium arsenide, semiconductor alloy, indium base alloy, indium

ABSTRACT: The article reviews the literature data on the properties of certain impurities in gallium arsenide and the materials and methods used by various authors for preparing ohmic contacts on n- and p-type GaAs. Such contacts are made by fusing in indium, tin, and lead, alloys of indium and gold, and also alloys of silver with zinc and silver with lead. Indium is preferred for ohmic contacts on n-type GaAs with an electron concentration between 1.5×10^{17} and $1 \times 10^{19} \text{ cm}^{-3}$ and on p-type GaAs with a hole concentration $> 2 \times 10^{18} \text{ cm}^{-3}$; an alloy of indium with a small amount of zinc (about 1%) is preferred for contacts on p-type GaAs with a hole concentration $< 2 \times 10^{18} \text{ cm}^{-3}$ if the contacts are intended for operation at temperatures not above 150C. The advantages of indium and its alloy with a small amount of Zn are: (1) they form low-resistance ohmic

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contacts on GaAs at relatively low melting points; (2) they are the softest contact materials and hence do not cause mechanical strains in GaAs near the contact; (3) they do not undergo any structural transformations (in contrast to Sn) over a range extending from the melting point to the temperature of liquid helium.
Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad (Physicotechnical Institute, AN SSSR)

SUBMITTED: 22Jan65

ENCL: 00

SUB CODE: IC, MM

NO REF SOV: 018

OTHER: 056

Card

2/2

IMENKOV, A.N.; KOZLOV, M.M.; MESKIN, S.S.; NASLED OV, D.N.; RAVICH, V.N.;
TSARENKOV, B.V.

Electroluminescence spectra of strongly degenerate gallium
arsenide. Fiz. tver. tela 7 no.3:775-780 Mr '65. (MIRA 18:4)

1. Fiziko-tekhnicheskii institut imeni Ioffe AN SSSR, Leningrad.

BURLINOV, V. .: GILIN, I.D.; NASHENKO, I.N.; TOLSTENKO, I.V.

Study of the p-n junctions of gallium arsenide with differential capacitance dependent on the potential. Radiotekh. i elektron.
10 no.3:468-475 Mr '65. (MIRA 18:3)

1. Fiziko-tekhnicheskiy institut im. A.F. Ioffe AN SSSR.

IVANOVA, Ye.A.; NASLEDov, D.N.; TSARENKOV, B V.

Electric properties of diffusion p-n junctions in gallium arsenide.
Direct branch of the voltage-current characteristic. Radiotekh. i
elektron. 10 no.4:703-714 Ap '65.

Electric properties of diffusion p-n junctions in gallium arsenide.
Reverse branch of the voltage-current characteristic. Ibid.:715-719
(MIRA 18:5)

1. Fiziko-tehnicheskii institut im. A.F.Ioffe AN SSSR.

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AA 00000

STEWARTS - 100000-100000

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SUB CODE: 00

100000 100000

YEFIMOV, A.D., inzhener; PAVLOV, V.I., inzhener; CHURENKOV, A.V., tekhnik;
SERGEICH, V.I., tekhnik; TSARENKOVA, B.S., motoristka.

Autoclave porous-concrete building products from waste cinder.
Rats.i izobr.predl.v stroi. no.55:18-19 '53. (MLRA 7:3)
(Cinder blocks)

TSARES, P. G.

Tsares, P. G. "Saki mud treatment of patients suffering of chronic osteomyelitis of the thigh and the knee due to old gunshot wounds", Sbornik nauch. trudov Kurorta Saki, Vol. IV, 1948, p. 97-106.

So: U-3261, 10 April 1953 (Letopis 'Zhurnal 'nykh Stoley, NO. 12, 1949).

TSAREV, A.A., elektromekhanik

Change the design of the dividing junction boxes. Avtom. telem. i
sviaz' 3 no.8:28 Ag '59. (MIRA 13:2)

1. Minskaya distantiya signalizatsii i svyazi Belorusskoy dorogi.
(Railroads--Electric equipment)

GRODZENSKAYA, I.IA., inzh.; TSAREV, A.I., inzh.

In situ investigation of the work of the anchored upstream floor of the Volga Hydroelectric Power Station. Trudy Gidroproekta 2: 168-176 '59. (MIRA 13:7)

1. Nauchno-issledovatel'skiy sektor Vsesoyuznogo proyektno-izyskatel'skogo i nauchno-issledovatel'skogo instituta "Gidroproekt" im. S.Ya.Zhuk.
(Volga Hydroelectric Power Station--Dams)

TSAREV, A.I., inzh.; FEL'DMAN, A.I., inzh.; GROBOV, P.A., inzh.

Measuring thermal stresses on the surface layer of reinforced
concrete structures. Gidr.stroi. 34 no.11:27-30 N '63.(MIRA 17:3)

VERTMAN, D.A., inzh.; TSAREV, A.N., inzh.

Dismantable metal scaffolding for repair operations in the furnaces
of large boilers. Elek. sta. 35 no.6:79-80 Je '64.

(MIRA 10:1)

TSAREV, A.V., kand. tekhn. nauk, inzhener-kapitan 3-go rango

Academician A.N. Krylov's works on photogrammetry. Mor. sbor.
47 no. 11:77-80 N 103. (MIRA 16:11)

EGLOV, G.D.; TSAREV, A.Y.

Design for windshield defroster. Prom. eng. 12 no. 5:22 My '57.
(Automobiles--Windows and windshields) (MLRA 10:6)

1940

[illegible]

the 1990s, the number of people in the United States who are 65 years of age or older is projected to increase from 20 million to 30 million, and the number of people 75 years of age or older is projected to increase from 10 million to 15 million (U.S. Census Bureau, 1996).

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AD 12-0

APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001756920004-7"

TSAREV, B.A.; inzh.; URAZOV, Ye.S., inzh.

Potentialities for reducing the time required for ship design.
Sudostroenie 29 no.2:52-53 F '63. (MIRA 16:2)
(Naval architecture)

TSAREV, B. A.

OK

Preparation of highly dispersed lead chromates resistant to light. A. M. Brusikovskii and B. A. Tsarev. *Org. Chem. Ind.* (U. S. S. R.) 3, 218-23 (1957).-- $PbCrO_4$ and $7 PbCrO_4 \cdot PbSO_4$ of high dispersion (up to 0.5 μ) and rhombic modification were obtained in the lab. and on a comm. scale with the aid of the Petrov contact mixt. (naphthalenesulfonic acids) alone and in mixts. with soap. These chromates are sufficiently resistant to light, giving films that practically do not darken on exposure for a considerable period of time. They possess a great covering power and a very high stability in suspensions (casein paste) as compared with the com. Pb chromate pigments. Their use in the prepn. of casein dyes for leather is recommended. The methods of prepn. and testing are described. About 25 references. Chas. Blanc

ADV. S.E.A. METALLURGICAL LITERATURE CLASSIFICATION

CIA-RDP86-00513R001756920004-7"

TSAREV, B. A.

CA

26

The influence of the conditions of hydrolysis of titanium sulfate on the properties of the titanium dioxide produced. M. S. Platonov, B. A. Tsarev, and F. A. Vakhovskaya. *Bull. Leningradsk. Univ.* 1958, No. 10, 84-85. *Abstr. Refrat. J.* 2, No. 5, 111 (1958). Preliminary investigations showed that hydrolysis of a soln. contg. 10% Ti sulfate yields a product that is analogous to that obtained from concd. solns. Commercially valuable TiO_2 can be obtained from dil. soln. only if the soln. is acid. ZnO increases the velocity of hydrolysis. W. R. Henn

ADD 55.4 METALLURGICAL LITERATURE CLASSIFICATION

TSAREV, B.A.

Red basic lead chromate pigments. B. A. Tsarev and A. M. Brusilovskii. *Trudy Inst. Lakot i Kratok* 2, 75-85 (1939).—Pigments contg. various proportions of $PbCrO_4$, $PbSO_4$ and $PbMoO_4$ were prepd. from $PbCl_2$, K_2CrO_7 , $(NH_4)_2MoO_4$, concd. H_2SO_4 and HNO_3 (80%). The following formulas are recommended: $PbCl_2$, 1000 kg., K_2CrO_7 , 303, H_2SO_4 , 32, $(NH_4)_2MoO_4$, 53; $PbCl_2$, 1000 kg., K_2CrO_7 , 320, Na_2SO_4 , 93, $(NH_4)_2MoO_4$, 53; $PbCl_2$, 1000 kg., K_2CrO_7 , 450, Na_2SO_4 , 3, $(NH_4)_2MoO_4$, 43. A wooden keg with a mechanical agitator is charged with 100 kg. $PbCl_2$, 6.3 cu. m. water is added and the mixt. is agitated for 1 hr. In another keg are dissolved 30.3 kg. K_2CrO_7 , 5.3 $(NH_4)_2MoO_4$, 3.2 H_2SO_4 (calcd. on monohydrate) and 3.2 cu. m. water, and the soln. is poured during one hr. into the reactor. The mixt. is then agitated for an other hr. and the pigment obtained is washed, filter-pressed and dried. The pigment prepd. with Mo was more light stable than cinnabar and the basic pigment. Its light stability is the same as that of cadmium red, while its covering ability is 2.8 higher than that of the basic Cr pigments. The expts. are described.

A. A. Bochtlingk

ASS. SLA METALLURGICAL LITERATURE CLASSIFICATION

$$T_{\text{max}} = 4.5 \text{ H}$$

25

Stability of titanium sulfate solutions. B. A. Tsarev and T. A. Vekholavinskaya, *Russk. Khim. Rev.* 1939, 10, 111. A relationship between stability and "acid factors" (ratio of active Ti to TiO_2) at 15°, 18° and 30° was established. When \log time is plotted against "acid factors" straight lines are obtained. Their slope decreases with increased temp.

David Aronov

David Arkov

ASB SLA DETALLING LITERATURE CLASSIFICATION

834 834175

[illegible]

18

1ST AND 2ND ORDERS

PROCESSING AND PROPERTY INDEX

180 AND 4TH ORDERS

Common Elements

Common Valency Notes

Hydrolysis of titanium sulfate. B. A. Tsipraz and T. A. Veltkoslavinskaya. *Byull. Obshch. Opyt. Laboratornoi Prom.* 1939, No. 6-7, 26-7; cf. C. A. 34, 8009. - Evapn. of hydrolyzing solns. of Ti sulfate shows reversibility of the reaction. It is known that solns. contg. 120 g. TiO₂ per l. and having an acid value of 4 hydrolyze to the extent of 96%. At the end of hydrolysis the acid value increases to 100. Soln. begins when the acid value is 12-17. However, if evapn. of the soln. is stopped when an acid value of 17 is reached, hydrolysis reaches 98%. Toward the end of hydrolysis the acid value reaches 40. Evapn. of hydrolyzing soln. changes 2 variables simultaneously; it increases the acidity of the medium and increases the b. p. of the soln. Titanyl sulfate and metatitanic acid can be hydrolysis intermediates.

Ceramic filters for metatitanic pulp. Hohlberg, Erin, Krylov and Evikova. *Byull. Obshch. Opyt. Laboratornoi Prom.* 1939, No. 6-7, 29. - Ceramic filters can be used for the filtration of metatitanic pulps. When they get stopped up, hot acid cleans out the pores.

David Aelony

4TH-5LA METALLURGICAL LITERATURE CLASSIFICATION

FROM SOURCE

FROM SOURCE

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FROM SOURCE

26

TSAREV, B.A.

11. AL. STATE

Mechanism of hydrolysis of titanium sulfates. B. A. Tsarev and N. N. Zolotov. *Byull. Obshch. Opyt. Laborat. Prom.* 1939, No. 8, 16-17.—The colloidality of solns. was studied (1) by counting the no. of particles per vol. of soln. by means of an ultramicroscope and (2) by nephelometer. The 2nd method was superior to the 1st. A part of the soln. filtered through a layer of meta-titanic acid was used as a standard. Thus solns. having an acid factor (F) of 1.5-4.5 were studied after standing for 6 months. When $F = 4.5$ the colloidality was 11.2, while when $F = 1.5$ the degree of colloidality reached 180.0. A similar effect was noticed in solns. in concns. of 80-250 g./l. A decrease in concn. greatly increases the degree of colloidality.

David Aekny

ASB-SEA METALLURGICAL LITERATURE CLASSIFICATION

FROM SOURCE

ALLIST ONE ONLY 181

TSAREV, B. A.

Dissertation: --"Oxidation of Color Developer by Atmospheric Oxygen and Silver Bromide." Cand Chem Sci, Leningrad Inst of Cinema Engineers, Leningrad 1953
W-30928

SO: Referativnyy Zhurnal, No. 5, Dec 1953, Moscow, AN USSR (~~W-30928~~)

"APPROVED FOR RELEASE: 03/14/2001

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CIA-RDP86-00513R001756920004-7"

TSAREV, B.A.; KOL'TSOV, V.V.

Colorimetric method of analyzing diethyl-paraphenylenediamine in a
color developer. Trudy LIKI no.3:207-212 '55. (MLRA 9:8)

1. Kafedra tekhnologii proizvodstva kinofotomaterialov.
(Color photography--Developing and developers)
(Phenylenediamine)

TSAREV, B.A.; GANNEMAN, V.V.; MARTYSH, G.G.; YAKOVLEVA, T.P.

Use of polyvinyl alcohol in photographic emulsions. Trudy LKI
no. 5:159-164 '59. (MIRA 13:12)

1. Kafedra tekhnologii proizvodstva kinofotomaterialov.
Leningradskogo instituta kinoinzhenerov. (Vinyl alcohol)
(Photographic emulsions)

TSAREV, B.A.; BOGDANOV, L.M.; MARTYSH, G.G.; LIPCHANSKAYA, V.I.

Possibility of partial substituting of synthetic polymers
for gelatin in photographic emulsions. Tekh.kino i telev.
4 no.8:8-11 Ag '60. (MIRA 13:8)

1. Leningradskiy institut kinoinzhenerov.
(Photographic emulsions)

TSAROV, I. M., Engr.

Genl. Tech. Sci.

Dissertation: "Contact Difference of Potentials (Its Nature and Influence on the Operation of Electric Vacuum Appliances)." All-Union Electrical Engineering Inst. of the USSR.

SC: Vychernyaya Moskva, Apr, 1947 (Project #1947)

10-E.

Valves & Instruments

021 984 1 1226
Electrometer Valves. H. M. Tsarev. (Upravleniye
Nauk, 1948, No. 2, pp. 251-270. In Russian.) A detailed
survey giving data on valves manufactured in Russia
and elsewhere.

11/11

PA 11/49T38

TSAREV, B. M.

Jun 48

USSR/Electricity
Electrometers

"Electrometric Tubes," B. M. Tsarev, 19 $\frac{1}{2}$ pp

"Uspekhi Fiz Nauk" Vol XXXV, No 2

Treats subject under: (1) grid currents, their classifications, causes and methods of reducing them; (2) main types of electrometric tubes; (3) stability of electrometric tubes and methods of increasing it. Discusses use of standard mass-produced tubes in electrometric circuits. Includes photographs, tables, and diagrams.

11/49T38

TEAROV, E. M.

Computation and design of electron tubes Moscow, Gos. energ. izd-vo, 1955.

4 (1.e.344) ! (52-66155)

TK6565.V3T8

TSAREV Boris Mikhaylovich
TSAREV, Boris Mikhaylovich; YALTUNOVSKAYA, M.V., redaktor; AKHLAMOV,
S.M., tekhnicheskii redaktor.

[Contact differential potentials and their effect on the
operation of vacuum-tube devices] Kontaktnaia raznost' potentsialov
i ee vliianie na rabotu elektrovakuumnykh priborov. Izd-vo 2-oe
perer. i dop. Moskva, Gos.izd-vo tekhniko-teoret. lit-ry, 1955.
280 p. (MLRA 8:12)

(Electron tubes)

TSARLV, B

M

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652.4
.78

BERECHNUNG UND KONSTRUKTION VON ELEKTRONENROHREN.
BERLIN, VEB VERLAG TEHNIK, 1955.

394 P. DIAGRS., TABLES.

ALSO T. P. IN RUSSIAN.

TR. FROM THE RUSSIAN "RASHET KONSTRUKTSIYE
ELEKTRON. YKH LAMP"

LITERATURVERZEICHNIS: P. 329-330.

"MEASUREMENT AND CONSTRUCTION OF ELECTRON TUBES."

RESHETNIKOV, A.M.; SAL'NIKOV, P.I.; TSAREV, B.M.

Tungsten crystal formations. Zhur.tekh,fiz, 25 no.3:414-415 Mr '55.
(Tungsten) (Crystallography) (MIRA 8:5)

SUPPE, G.H.; TSAREV, B.M., prof., otvetstvennyy red.

[Electron emission from metallic crystals] Elektronnaya emissiya
metallicheskikh kristallov. Tashkent, Izd-vo SAGU, 1957. 111 p.
(Tashkent. Universitet. Trudy Sredneaziatskogo gosudarstvennogo
universiteta, no.115. Fiziko-matematicheskie nauki, no.17).
(Electron emission) (Metals) (MIRA 11:10)

Tsarev, B. M.

TSAREV, B.M., prof.red.; VISKOVA, M.V., red.; IOVLEVA, N.A., tekhn.red.

[Oxide-coated cathodes; a collection of papers delivered at the International Congress commemorating the fiftieth anniversary of the invention of the oxide-coated cathode] Oksidnyi katod; sbornik trudov Mezhdunarodnogo kongressa, posviashchennogo piatidesiatiletiu otkrytiia oksidnogo katoda. Pod red. B.M.TSareva. Moskva, Izd-vo inostr. lit-ry, 1957. 480 p. (MIRA 11:3)

1. Congrès international du cinquantième de la cathode à oxydes.
Paris, 1955.
(Cathodes) (Electron tubes)

TSAREV, B. M.

109-6-1/17

AUTHOR
TITLEPERIODICAL
ABSTRACT

TSAREV, B.M.

The Ways of Development of Thermoionic Cathodes
(Puti razvitiya termoeletronnykh katodov. Russian)
Radiotekhnika i Elektronika, 1957, Vol 2, Nr 6, pp 675 - 687 (U.S.S.R.)

In its essential parts the present work deals with the modern development of thermoionic cathodes for ultra-high-frequency electronics. The demands made on the occasion of the production of lamps with a net-control for broad band amplifiers are shortly discussed. The first mentioned of these demands is the limitation exercised by the specific power dispersed by the electronic collector. The author shows that the cathode-types present do by far not meet the demands in relation to the emission-current density. The present classification of thermoionic cathodes as well as the degree of security of their meeting the demands on the occasion of their work in different electro-vacuum apparatus. Further development must be in accordance with the demands at the expense of the high emission-current density as well as of the operation temperatures of the cathodes as this is dictated by the necessity of decreasing the level of static and increasing life. One of the directions for a possible elaboration of the electron-flow with high density can, on the one hand, be the investigation and elaboration of hollow cathodes and, on the other hand, the formation of ca-

Card 1/2

109-6-1/17

The Ways of Development of Thermoionic Cathodes
thode-accumulations with a focusing of the electronic flow by means
of an optic fixed to the cathode. Three possible ways for the increase
of the emission-capability of the cathodes are shown and investigated.
Two directions for the development of the metal-capillary cathodes
are described, in one of which the development of a number of compli-
cated cathodes takes already place. (With 6 illustrations and 4 Sla-
vic references).

ASSOCIATION
PRESENTED BY
SUBMITTED
AVAILABLE

Not given

29.10.1956
Library of Congress

Card 2/2

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68954
SOV/81-60-2-4306

Translation from: Referativnyy zhurnal. Khimiya, 1960, Nr 2, p 103 (USSR)

AUTHORS: Kudintseva, G.A., Tsarev, B.M., Epel'baum, V.A.

TITLE: The Borides¹ of the Transition Metals and Their Electron-Emission¹ Properties

PERIODICAL: V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy. Moscow, Goskhimizdat, 1958, pp 106 - 111

ABSTRACT: A method was described for obtaining the diborides of Ti¹, Zr¹, V¹, Cr¹, Mn and other transition metals by means of combined reduction by carbon of the mixtures of oxides of the corresponding metal and boron; the method permits the production of borides in large quantities from easily available raw material. In the series of the diborides of Ti, V, Cr, and Mn the greatest emission, comparable to the emission of Ce hexaboride, has Cr diboride which can be used as material for thermocathodes. The diborides have a coefficient of secondary emission which is less than unity and can be used therefore as anti-dynatronic coatings.

Authors' summary ✓

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68953

SOV/81-60-2-4305

Translation from: Referativnyy zhurnal. Khimiya, 1960, Nr 2, p 103 (USSR)

AUTHORS: Kudintseva, G.A., Epel'baum, V.A., Tsarev, B.M.

TITLE: The Synthesis of Hexaborides of Some Rare Earth Metals and Their Electron-Emission Properties

PERIODICAL: V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy. Moscow, Goskhimizdat, 1958, pp 112 - 119

ABSTRACT: The hexaborides of La, Cr, Pr, Nd and cerium-mixmetal can be obtained by the combined reduction of a mixture of the oxide of the corresponding rare earth element and boron by carbon by means of thermal treatment under a certain condition (by stages). The emission constants of La and Ce hexaborides coincide well with the literature data; the constants of cerium-mixmetal boride deviate from them, which can be explained by the difference in the composition of the cerium-mixmetal samples. The coefficients of the secondary emission of all hexaborides are less than unity, i.e., these hexaborides can be used for anti-dynatronic coatings, especially the hexaborides of Nd and Pr, which have also a low thermo-ionic emission

Card 1/2

68953
SOV/81-60-2-4305

The Synthesis of Hexaborides of Some Rare Earth Metals and Their Electron-Emission Properties

activity. La hexaboride, due to the high thermo-ionic emission, can be used for the manufacture of cathodes for powerful superhigh-frequency devices. The low coefficient of secondary emission makes it impossible, however, to employ it for magnetronic cathodes. The radiation coefficients of all hexaborides are within the range 0.65 - 0.70. The hexaborides react with the underlaying material, forming Ta boride.

From the authors' summary ✓

Card 2/2

154820, B.M.

109-3-2/23

AUTHORS: Nikonov, B.P. and Tsarev, B.M.

TITLE: Investigation of Nickel Alloys for Oxide Cathode Cores
(Issledovaniye nikelovykh splavov dlya kernov oksidnykh katodov)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol.III, No.3,
pp. 313 - 321 (USSR).

ABSTRACT: An attempt is made to find such reducing agents which, when added to the core of an oxide cathode, will readily evaporate from the cathode nickel at the activation temperatures and will produce compounds (at the boundary between the oxide layer and the core) having conductivity approximately equal to that of the oxide layer. An estimate of the reducing properties of various elements with respect to the oxides of rare metals can be done on the basis of the free energy of the chemical reaction involved. Such estimates were made by A. White (Ref.4) for certain oxide cathode reactions; similar calculations were made by the authors for a large number of the reactions (Ref.5). The resulting data are indicated in Table 2, which shows the value of the free energy, the equilibrium constants and the vapour pressure of barium during the thermal dissociation and reduction of barium by Ni, W, Si, Ti, Al, Mg, Th, Ca and Sr. The table shows that very low barium vapour

Card 1/4

100-3-2 '23

Investigation of Nickel Alloys for Oxide Cathode Cores

pressures are obtained during the thermal dissociation so that these pressures can produce the concentrations of free metal in an oxide layer of the order of 10^{-14} or 10^{-13} at the normal operating temperatures of the cathode. This quantity of the free metal is much lower than that necessary for the activation. Further data on the reaction between oxide layer and the core are shown in Fig.8; these were taken from a work by A. Eisenstein (Ref.8). From the above, it is concluded that from amongst the various metals, only Ba, Sr and Ca have the necessary evaporation rate, satisfactory reducing properties and low inter-face resistance. Some experimental measurements were also carried out to investigate the problem more satisfactorily. The first series of experiments were done on thermionic diodes having flat cathodes and Kovar anodes. The temperatures of the cathode were measured in each tube by means of a thermocouple. The cathodes had a diameter of 5 and 3.6 mm, were made of nickel tape, and were coated with double carbonate. The thickness of the coating was 100 to 220 μ . Two types of the experimental tubes are shown in Figs. 2 and 3. The characteristics of the tubes were measured by means of pulses having 2.2 μ sec. duration and 100 p.p.s. repetition rate. The results

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109-3-2/23

Investigation of Nickel Alloys for Oxide Cathode Cores

are reported in Tables 3, 4, 5 and 6 and in Figs. 4 to 8. From Tables 4 and 5, it follows that Ca and Sr activate the cathode very satisfactorily, while W is less satisfactory; practically no activation can be obtained on a pure nickel. Figs. 6 show the change of the emission current as a function of time for nickel-cathodes with the following admixtures: 1) Ca; 2) Si; 3) W; 4) Mg, and 5) pure electrolytic Ni. From these, it follows that the tubes fitted with a Ni-Ca cathode core give the highest stable currents, while the tubes fitted with other types of cores have comparatively low emission currents which can be attributed to either their poor activation properties or high inter-face resistance, or both. Figs. 7 and 8 show the mutual conductance of two commercial tubes which were fitted on the following types of cathodes: a) Ni-Ca; b) Ni-W, and c) Ni-Si. The above investigation showed that the inclusion into the Ni core of an oxide cathode of such admixtures as Ca and Sr is highly desirable, since it leads to an improvement in the cathode characteristics; the cathodes can easily be activated, have a comparatively low inter-face resistance and give a stable emission.

Card3/4 There are 8 figures, 6 tables and 11 references, 8 of which are English and 3 Russian.

Investigation of Nickel Alloys for Oxide Cathode Cores 109-3-2/23

SUBMITTED: May 31, 1957

AVAILABLE: Library of Congress
Card 4/4

109-3-16/23

AUTHORS: TSAREV, B.M.
Kudintseva, G.A. and Tsarev, B.M.

TITLE: Emission Characteristics of the Hexaborides of Certain
Rare Earth Metals (Emissionnyye svoystva gekksaboridov
nekotorykh redkozemel'nykh metallov)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol.III, No.3,
pp. 428 - 429 (USSR).

ABSTRACT: Works functions ϕ and emission constants A of the
following compounds were investigated: GdB_6 , DyB_6 , ErB_6 , HoB_6
 YbB_6 and LuB_6 . The results are shown in the table on p.428,
together with similar constants for various other hexaborides.
The work function of various hexaborides as a function of the
atomic number of the metallic elements is shown in the figure
on p.429. It is found that the thermionic emission of GdB_6 is
much higher than that of LaB_6 and that GdB_6 can be used as the
material for efficient cathodes. The only obstacle in the
realisation of such cathodes is a comparative "rarity" of
gadolinium, but it is to be expected that this will be over-
come in the near future. There are 1 table, 1 figure and
5 references, 2 of which are English and 3 Russian.

SUBMITTED: November 14, 1957

AVAILABLE: Library of Congress
Card 1/1

SOV/109-3-8-5/18

AUTHORS: Kapitsa, E.I., Mel'nikov, A.I., Morozov, A.V., Popov, B.M.,
Sobolevskaya, R.B., Tsarev, B.L. and Shul'man, A.R.

TITLE: Thermionic Properties of Barium Tungstate (Termo-
elektronnyye svoystva vol'framata bariya)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 8,
pp 1010 - 1016 (USSR)

ABSTRACT: The work described was concerned with the investigation
of the thermionic emission of barium tungstate and
 Ba_2CaWO_6 . The investigation was undertaken since it was
thought that the resulting data might be useful in
explaining the operation of the pressed cathodes and other
cathodes which contain barium tungstate. The investi-
gations were carried out on directly heated cathodes
which were based on tungsten and molybdenum cores. The
measurements were made on special experimental diodes,
fitted with protective anodes. The cathode temperature
was determined by measuring the change in the resistance
of the core. All the measurements were done under
static conditions. The coating of Ba_3WO_6 and Ba_2CaWO_6
were effected by two methods: a) a filament of the

Card1/4

SOV/109-3-8-5/18

Thermionic Properties of Barium Tungstate

core metal was passed through a drop of the coating substance mixed with a binder; b) cataphoretic coating was used. In the first case, coarse-grain coatings were obtained, while the second method permitted obtaining the particles having a diameter of about $1 - 5 \mu$. The cathodes were de-gassed by heating up to 1250°K for the duration of 1 - 2 hours without taking any current.

This processing resulted also in a partial activation of the cathodes. Further activation of the cathodes (by heating and taking the current) was then carried out. During the preliminary activation, it was found that the work function (as measured from the Richardson curves) was of the order of 2.2 eV, while after the final activation, the work function dropped to 1.2 - 0.5 eV. The characteristics of a barium-tungstate cathode after final activation are shown in Figure 2. The emission current and the work function of the same cathode for various activating temperatures are given in Table 1. On the other hand, it was found that the cathodes of $\text{Ba}_2\text{CaW}_6\text{O}_{26}$ had very low emission densities. These were of the order

Card2/4

Thermionic Properties of Barium Tungstate

SOV/109-3-8-5/18

$\mu\text{A}/\text{cm}^2$, as can be seen from Table 2. By comparing the results of Table 2 with those for Ba_3WO_6 (given in Table 3), it is seen that the emission of the latter is about 100 times higher than that of the former. It was found that the curve:

$$\lg \frac{I}{T^2} = f\left(\frac{1}{T}\right)$$

for the cathode of barium tungstate consists of three regions (Figure 4). At low temperatures (below 900°K), the curve has the highest slope; the work function in this region is equal to 1.3 eV. In the regions of temperatures from $900 - 1250^\circ\text{K}$, the work function has a value of about 0.6 - 0.7 eV. Finally, at temperatures above 1250°K , the current decreases as a function of temperature and the slope of the curve cannot be regarded as representing the work function.

Card3/4

Thermionic Properties of Barium Tungstate

SOV/109-3-8-5/18

There are 5 figures, 5 tables and 4 references, 3 of which are Soviet and 1 English.

SUBMITTED: January 29, 1958

Card 4/4 1. Barium tungstates--Properties 2. Thermionic emission--Analysis
3. Cathodes--Performance

AUTHORS: Nikonov, B.P., Tarash, I.I. and SOV/109-3-8-10/18
Tsarev, B.M.

TITLE: Influence of the Temperature and Core Material on the
Life of an Oxide Cathode (Vliyaniye temperatury i
materiala kerna na dolgovechnost' oksidnogo katoda)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, nr 8,
pp 1043 - 1045 (USSR)

ABSTRACT: The investigations described were carried out on tubes,
type 6Zh1P, the cathode temperatures being 780, 820 and
850 °C. The cores of the tube cathodes were either of
pure, electrolytic nickel, nickel with admixture of
strontium or nickel with tungsten. The chemical compo-
sition of these core materials is shown in the table
on p 1043. The cathodes of the tubes were coated with
the triple carbonate of the standard composition and the
tubes were mounted, pumped and activated by the usual,
standard technique. The experimental results are shown
in Figures 1, 2, 3 and 4. The curves of Figure 1 show
the emission current as a function of time for the three
cathode temperatures. The curves of Figure 2 represent
the slope of the tubes as a function of time for the
above three temperatures. Figure 3 shows the current of

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SOV/100-3-8-10/18

Influence of the Temperature and Core Material on the Life of an Oxide Cathode

the tubes as a function of time for the three core materials, while figure 4 shows the current for various temperatures for the nickel-strontium cathode. From the investigation, it is concluded that long life in the tubes can be secured by running the cathodes at a comparatively low temperature (750 - 780 °C). It was also found that the amount of an activator in the cathode core should be small but it must be sufficient to permit an adequate activation of the cathode. There are 4 figures and 7 references, 6 of which are Soviet and 1 English.

SUBMITTED: January 29, 1958

Card 2/2

1. Oxide cathodes--Life expectancy
2. Oxide cathodes--Materials
3. Oxide cathodes--Temperature factors
4. Oxide cathodes--Test results

SOV/126-6-2-11/34

AUTHORS: Kudintseva, G. A., Polyakova, M. D., Samsonov, G. V.
and Tsarev, B. M.

TITLE: Preparation and Certain Properties of Yttrium Hexaboride
(Prigotovleniye i nekotoryye svoystva geksaborida
ittriya)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958 Vol 6, No 2
pp 272-275 (USSR)

ABSTRACT: The reaction $Y_2O_3 + 3B_4C = 2YB_6 + 3CO$ was studied over
the range 880-1900°C; the reaction occurs in one stage
at 970°C. ΔH_{298}^0 is about 24 kcal/mol for YB_6 .
analysis gives 42.11% B (theory 42.19%). Yield at
1800-1900°C 92-93% (YB_6 partially dissociates at this
temperature). The powder pattern gives the lattice
constant as 4.128 Å. Table 1 gives the χ , ρ , μ and
intensity values. The pycnometer density is $3.64 \pm$
 0.04 g/cm³ (X-ray density 3.633). Hot-pressed
specimens have a microhardness of 3264 ± 21 kg/mm²
Card 1/2 (50 g load); YB_6 reacts with graphite at 2100-2150°C.

SOV/126-6-2-11/34

Preparation and Certain Properties of Yttrium Hexaboride

and fuses at about 2300°C . The thermionic emission (Richardson) curve is compared with those for LaB_6 and CeB_6 ; the relevant constants are work functions 2.22 ± 0.05 eV and $A = 15$ amps/cm² deg². The thermal emission coefficient at 1500°C is 0.7 (for 655 mμ). The results are discussed in relation to the electronic structure of the compound. There are 2 figures, 3 tables and 11 references, 5 of which are Soviet, 5 English, 1 German.

ASSOCIATION: Institut metallokeramiki i spetsialnykh splavov
AN Ukr SSR (Institute of Metal Ceramics and Special
Alloys, Ac.Sc. Ukr. SSR)

SUBMITTED: December 20, 1956

Card 2/2 1. Yttrium borides--Preparation 2. Yttrium borides--
Properties

TSAREV, B.M., inzh.

New tool for cutting stone test pieces to be used in laboratory tests. Stroim. 5 no.12:35-36 D '59. (MIRA 13:3)
(Stonecutting--Equipment and supplies)

AUTHORS: Bondarenko, B.V. and ~~Tsarev, B.M.~~ SOV/109-4-6-23/27
TITLE: Thermo-electronic Characteristics of the Metal Oxides of the III and IV Groups (Termoelektronnyye svoystva okislov metallov III i IV grupp)
PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 6, pp 1059 - 1060 (USSR)
ABSTRACT: The metal oxides Sc_2O_3 , Y_2O_3 , La_2O_3 , TiO_2 , ZrO_2 and HfO_2 have comparatively high melting points and are therefore of interest as the materials for the cathodes operating at high temperatures. ThO_2 is an oxide of the same type. The investigation described aimed at determining the emissivity of the above oxides. The cathodes prepared from La_2O_3 and TiO_2 were activated at a temperature of 2 200 °K, while the remaining oxides were activated at 2 600 °K. The current-temperature curves for all the materials are indicated in the figure on p 1059. It is seen that the Richardson curves for all the oxides except TiO_2 consist of two linear portions. This is thought to

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SOV/109-4-6-23/27

Thermo-electronic Characteristics of the Metal Oxides of the III and IV Groups

be due to the dependence of the electrochemical potential of the semiconductor cathodes on the equilibrium concentration of donors within the investigated temperature interval (B.V. Bondarenko - Ref 10). The table on p 1060 shows the values of φ_0 and A obtained from the

Richardson curves. The work function of the cathodes φ_T is also shown in the table. From the investigation, it is concluded that apart from ThO_2 and Y_2O_3 , the hafnium oxide HfO_2 is the most promising material. This is principally due to the fact that HfO_2 forms very stable layers which are strongly attached to the tungsten core of the cathode.

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SOV/109-4-6-23/27

Thermo-electronic Characteristics of the Metal Oxides of the III
and IV Groups

There are 1 figure, 1 table and 10 references, 4 of which
are English, 1 French and 5 Soviet: 1 Soviet reference
is translated from French and 1 from English.

SUBMITTED: January 5, 1959

Card 3/3

GAPANOV, Viktor Ivanovich; IONOV, N.I., prof., retsenzent; NILENDER, R.A.,
prof., retsenzent; TSAREV, B.M., prof., retsenzent; BRAGINSKIY,
V.B., red.; MURASHOVA, N.Ya., tekhn.red.

[Electronics] Elektronika. Moskva, Gos.izd-vo fiziko-matem.
lit-ry. Pt.1. [Physical principles] Fizicheskie osnovy. 1960.
516 p. (MIRA 14:3)

(Electronics)

25971
S/539/60/000/031/004/014
E071/E135

9.3120

26.1640

AUTHOR: Tsarev, B.M.
TITLE: The role of the D.I. Mendeleev Law in modern cathode electronics
PERIODICAL: Moscow. Khimiko-tekhnologicheskii institut. Trudy, No.31, 1960. Issledovaniya v oblasti khimii i tekhnologii elektrovakuumnykh materialov. pp.29-35.
TEXT: The importance of D.I. Mendeleev's discovery of the periodical system of elements, which became the key to the solution of various problems in many branches of science and technology, including modern electronics, is discussed. It is considered that as yet insufficient attention is paid to the systematisation of experimental results obtained during various investigations in order to discover regularities which, in the light of the periodic law, would be of considerable help in the search for new materials. The latter is particularly true in the field of thermoelectronic emission, where the continuously increasing requirements of modern thermocathodes demand new materials. Binary compounds of oxides of high melting elements
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The role of the D.I. Mendeleev 25971
S/539/60/000/031/004/014
EO71/E135

with oxides of alkali metals are quoted as an example. The relationship between the electron work function and the atomic number of elements has been recently discussed. However, as the surface phenomena were compared with the properties of elements which are obviously volume properties (density and compression coefficient) the correlation was poor. The relationships between the coefficient of secondary electron emission (δ_{max}) and atomic number, according to data presented by N.G. Nakhodkin in 1955 at the All-Union Conference on cathode electronics (Ref.4: Kiyev, Vsesoyuznoye soveshchaniye po katodnoy elektronike, 1955, Izv. AN SSSR, Fiz., V.20, 1006 (1956)) and the dependence of the work function of hexaborides of rare earth elements on the atomic number (published by G.A. Kudintseva and the present author in Ref.5: Radiotekhnika i elektronika, Vol.3, No.3, 428 (1958)) are better and more pronounced. The above relationships and a few small annotations are all that have been quoted in Russian and foreign literature. The quoted Soviet information is summarised in plots Figs. 5 and 6. Therefore, the author stresses the necessity of carrying out investigations of relationships between

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The role of the D.I. Mendeleev

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emissive and other properties of elements and their compounds and the periodic system.

There are 6 figures and 6 references: 4 Soviet and 2 non-Soviet. The English language reference reads as follows:

Ref.2: J.F. Chittum, J. Phys. Chem., V.38, 79 (1934).

Caption to Fig.5 Dependence of σ_{\max} on the specific atomic number of the element, σ_{\max} versus atomic number

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26.1640

25972

S/539/60/000/031/005/014

EO71/E135

AUTHORS: Kovtunenkov, P.V., Kondakov, B.V., and Tsarev, B.M.

TITLE: On the chemical methods of determination of free alkali earth elements in effective thermocathodes made on the basis of compounds of these metals

PERIODICAL: Moscow. Khimiko-tekhnologicheskii institut. Trudy, No.31, 1960. Issledovaniya v oblasti khimii i tekhnologii elektrovakuumnykh materialov. pp. 36-45

TEXT: Despite the considerable number of experimental works, the problem of concentration of the excess of an alkali earth metal in an oxide cathode, particularly its dependence on various factors and its influence on the operation of the cathode, is not sufficiently clear. The appearance of a number of new types of cathode, the nature of which cannot be established without experimental investigation of the concentration and evaporation of excessive alkali earth elements, made the problem particularly important. For the above reason, the present authors surveyed papers published on this subject. As the concentration of the

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On the chemical methods of

excess of the alkali earth metal in an oxide cathode is of the order of 0.002-0.5 mole % the usual chemical methods are inapplicable and the determination is based either on the determination of the oxygen evolved (if the formation of the excess of the metal from its oxide is accompanied by the evolution of oxygen) or on the consumption of specially introduced gas, capable of combining with the metal. The following methods are described: a) after the usual treatment of the vacuum system, the cathode is activated by drawing the emission current. The oxygen evolved is pumped into a preliminarily evacuated volume and its amount measured with a compression manometer, after which some hydrogen is introduced and reacted with the oxygen. The water formed is frozen out and the measurement of the pressure is repeated. The difference in pressure is ascribed to oxygen. b) Based on the amount of oxygen necessary to transfer the free metal into its oxides. c) Based on a treatment of the activated cathode with water ($Me + H_2O = MeO + H_2$ or $Me + 2H_2O = Me(OH)_2 + H_2$) and measuring the amount of hydrogen evolved. The special feature of this method, proposed in 1932 by T.P. Bardennikova, is

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On the chemical methods of

the active reaction with water not only with the excess metal but also with oxides of alkali earth elements from which the cathode is made ($\text{BaO} + \text{H}_2\text{O} = \text{Ba}(\text{OH})_2$). This destroys the cathode, but the total excess of the free metal, i.e. not only present on the surface but also in the lattice of the oxide, is measured. d) Based on the reaction of the metal with nitrogen at 200-600 °C forming nitride (Ba_3N_2). On subsequent treatment of the cathode with water, the nitride formed is decomposed with the evolution of ammonia which is determined colorimetrically. e) Based on the reaction between the hot metal and carbon dioxide ($\text{Ba} + \text{CO}_2 = \text{BaO} + \text{CO}$). From the point of view of sensitivity, all methods with the exception of d) are approximately similar and their accuracy depends on the accuracy of the determination of the pressure of the gaseous product. However, the method c) is the most accurate. With the authors' apparatus [not described] it is possible to measure quantities of $3-5 \times 10^{-9}$ g of barium. The necessary precautions to obtain good results with this method are described in some detail (degassing of the glass and water, prevention of penetration of substances capable of reacting with water into the analytical system, e.g. material of

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On the chemical methods of

the base of the electrode and of the preheater). On the basis of the reaction with water, the authors developed a method of separate determination of barium present in the cathode and barium evaporated from it. A number of glass caps with a piece of iron hermetically sealed in each (to enable their transfer by a magnet) are placed in the vacuo system. At a given time such a cap is placed over the cathode and barium evaporating during the heat treatment condenses on the cap. Subsequently at a given time, the cap is transferred by a magnet into the analytical system for the water treatment and a new cap is put over the cathode. This method can be used for studies of the velocity of evaporation of alkali earth elements from any cathodes from which these metals evaporate. A simultaneous application of this type of analysis with the spectral analysis enables the determination of the rate of evaporation not only of the alkali earth metals but also of their oxides. The method is sufficiently reliable for the determination of the "equilibrium" concentration of alkali earth metals which is established in a cathode after a given time and given operating conditions.

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On the chemical methods of

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E071/E135

A.V. Morozov and A.I. Mel'nikov are mentioned for their contribution in this field.

There are 2 tables and 19 references: 7 Soviet, 1 German and 11 English. The four most recent English language references read as follows:

Ref.8: L.A. Wooten, G.E. Moore, W.G. Guldner,
J. Appl. Phys., V.26, 8, 937 (1955).

Ref.9: G.E. Moore, L.A. Wooten, J. Morrison,
J. Appl. Phys., V.26, 8, 943 (1955).

Ref.10: G. Zibowitz. J. Am. Chem. Soc., V.75, 1501 (1953).

Ref.17: E.S. Rittner. Philips Res. Rep., V.8, 184, (1953).

Card 5/5

26.2531
9.3120(1003,1137,1140)

S/109/60/005/008/008/024
E140/E555

AUTHORS: Bondarenko, B.V., Ostapchenko, Ye.P. and Tsarev, B.M.
TITLE: Thermionic Properties of Alkali-Earth Metal Tungstates
PERIODICAL: Radiotekhnika i elektronika, 1960, Vol. 5, No. 8,
pp.1246-1253

TEXT: The work functions and structures of a number of compounds, listed in the three tables, were studied by means of X-rays and electron-microscopy. The objects were, firstly, to find the barium tungstate compounds with optimum stability in vacuum at working temperatures of 1400-1700°K. Secondly, to find those with the best emission properties, and thirdly, to determine the effects of substitution of calcium and strontium for barium in the tungstates. The technology employed has been previously described (Ref.1). It was found that these tungstates may be synthesized by sintering in air, as well as in hydrogen as previously done. The high temperature stability of Ba_3WO_6 and $BaWO_4$ was already known from the literature. A new phase Ba_2WO_5 is found to have the same property. A number of compounds has been studied for the first time. It was found that Ba_3WO_6 on tantalum

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S/109/60/005/008/008/024
E140/E555

Thermionic Properties of Alkali-Earth Metal Tungstates

has better emission properties than on tungsten. For the tantalum base the basic tantalate is superior to tungstate. There are 3 figures, 3 tables and 3 references: 2 Soviet and 1 non-Soviet.

SUBMITTED: December 21, 1959

Card 2/2

83276

S/109/60/005/009/026/026
E140/E455

26.1632
9.3/20

AUTHORS: Bondarenko, B.V., Yermakov, S.V. and Tsarev, B.M.

TITLE: Thermionic Properties of Alkali-Earth Metal
Tantalates

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol.5, No.9,
pp.1553-1555

TEXT: This is a continuation of earlier work (Ref.1) in which basic barium tantalate was found to have higher emission properties than barium tungstate. A table of the 22 compounds studied is given on p.1555. It is found that basic barium tantalate has higher emissivity than basic barium tungstate but is less stable thermally. Its limiting temperature is therefore 1500°K, as compared with 1700 to 1800°K for the latter compound. There are 3 figures, 2 tables and 3 Soviet references. X

SUBMITTED: April 1, 1960

Card 1/1

TSAREV, Boris Mikhaylovich; ZASLAVSKIY, L.P., red.; FRIDKIN, A.M.,
tekh. red.

[Calculation and design of electron tubes] Raschet i konstruirovaniye elektronnykh lamp. Izd.2., perer. i znachitel'no dop. Moskva, Gos. energ. izd-vo, 1961. 671 p.

(MIRA 15:2)

(Electron tubes)

29327

S/109/61/006/010/026/027

D201/D302

26, 2532

AUTHORS: Bondarenko, B.V., Yermakov, S.V., and Tsarev, B.M.

TITLE: Thermo-electric properties of barium hafnates and perrhenates

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 10, 1961, 1773 - 1775

TEXT: In conjunction with the results of study of thermo-electric properties of barium tantalates by B.V. Bondarenko, Ye.P. Ostapchenko, and B.M. Tsarev, (Ref. 1: Radiotekhnika i elektronika, 1960, 5, 8, 1246) which were shown to be slightly better than those of barium tungstate, the authors give the results of their determining thermo-electric properties of barium hafnates of type $(\text{BaO})_n (\text{HfO}_2)_m$ with $n : m = 2 : 1; 3 : 1; 5 : 1; 7 : 1$; and of barium perrhenates $(\text{BaO})_n (\text{Re}_2\text{O}_7)_m$ with $n : m = 1 : 2; 2 : 1; 3 : 1; 5 : 1; 7 : 1$; The study of barium hafnates and rhenates with different content of barium oxide was required to determine the influence of barium oxide on the thermoelectric properties of complex oxide

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